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Financial Crises, Financial Dependence, and Industry Growth

Luc Laeven
Daniela Klingebiel
Randy Kroszner

The World Bank
Financial Sector Strategy and Policy Department
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Abstract

Laeven, Klingebiel, and Kroszner investigate the link between financial crises and industry growth. They analyze data from 19 industrial and developing countries that have experienced financial crises during the past 30 years to investigate how financial crises affect sectors dependent on external sources of finance. Specifically, the authors examine whether the impact of a financial crisis on externally dependent sectors varies with the depth of the financial system. They find that sectors highly dependent on external finance tend to experience a greater contraction of value added during a crisis in deeper financial systems than in countries with shallower financial systems. They hypothesize that the deepening of the financial system allows sectors dependent on external finance to obtain relatively more external funding in normal periods, so a crisis in such countries would have a disproportionately negative effect on externally dependent sectors. In contrast, since externally dependent firms tend to obtain relatively less external financing in shallower financial systems (and hence have relatively lower growth rates in such countries during normal times), a crisis in such countries has less of a disproportionately negative effect on the growth of externally dependent sectors.

This paper—a product of the Financial Sector Strategy and Policy Department—is part of a larger effort in the department to study the link between financial development and economic growth. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Rose Vo, room MC9-624, telephone 202-473-3722, fax 202-522-2031, email address hvo1@worldbank.org. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at llaeven@worldbank.org, dklingebiel@worldbank.org, or randy.kroszner@gsb.uchicago.edu. June 2002. (26 pages)

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Luc Laeven, Daniela Klingebiel and Randy Kroszner**

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** The authors are at the World Bank, the World Bank, and the University of Chicago, the Council of Economic Advisors and the National Bureau of Economic Research, respectively. Luc Laeven is corresponding author. E-mail: llaeven@worldbank.org. Tel. 202 458 2939. We thank Stijn Claessens and Inessa Love for comments and Ying Lin for research assistance. The opinions expressed do not necessarily reflect those of the World Bank or the Council of Economic Advisors. Comments welcome.

I. Introduction

While it is widely accepted that financial crises have adverse consequences for the economy as a whole, relatively little empirical work investigates the mechanisms by which financial crises generate problems in the real sector. In this paper, we analyze data from developed and developing countries that have experienced financial crises during the last 30 years to investigate the impact of crises on industrial growth in those countries. Understanding this impact is crucial for formulating policies to mitigate the costs of a crisis in the financial sector to the economy as a whole and contributes to the literature on the mechanisms linking financial shocks and real economic activity.

Much theoretical work has been done on how financial intermediaries and financial markets facilitate investment by firms and, hence, promote economic growth (see Levine (1997) and Rajan and Zingales (1998) for comprehensive overviews). Financial intermediaries and financial markets are generally thought to reduce moral hazard and adverse selection problems that can make raising external funds difficult and expensive for firms. Well-functioning and well-developed financial intermediaries and markets thus should disproportionately benefit firms that are most dependent on external funds to finance their growth. Conversely, crises in the financial sector should have a disproportionately negative impact on firms that rely heavily on external sources of finance. Specifically, we investigate whether the impact of a financial crisis on sectors dependent on external sources of financing varies with the level of development of the financial system. To evaluate the empirical relevance of this theoretical mechanism, our empirical work focuses on the differential impact of financial crises on sectoral growth.

To preview our results, we find that in well developed and deep financial systems, sectors highly dependent on external finance tend to experience a greater contraction of value added during a

crisis than do externally dependent sectors in countries with shallower financial systems. As has been shown in previous work (Rajan and Zingales, 1998), the depth of the financial system appears to relax credit constraints to permit externally dependent sectors to grow faster during normal periods. To explain our results, we hypothesize that the depth of the financial system allows sectors dependent on external finance to obtain relatively more external funding in normal periods, so a crisis would have a disproportionately negative effect on externally dependent firms. In contrast, since externally dependent firms tend to obtain relatively less external financing in shallower financial systems (hence, we observe relatively lower growth rates in externally dependent sectors in such countries during normal times), a crisis in such countries has less of a disproportionately negative effect on the growth of these sectors. These results provide evidence supporting the existence of a "credit channel" through which firms dependent on external finance are harmed disproportionately during periods of financial distress.

In the next section, we provide a more detailed motivation for the approach we are taking and relate our work to the existing literature. Section III explains our econometric approach. Section IV then describes the data and, in particular, how we measure financial dependence and how we define financial crises. Section V contains the results. Section VI presents a number of caveats and qualifications with respect to our analysis. Section VII concludes.

II. Motivations and relation to previous work

There exists a large body of empirical literature on the link between finance and growth. Levine and Zervos (1998) study whether stock markets and banks promote economic growth. They find that measures of stock market liquidity and private sector credit have a strong independent

effect on growth. Controlling for potential biases, Beck, Levine, and Loayza (2000) argue that there exists a clear empirical relation between the level of financial intermediary development and economic growth. They find that financial intermediaries exert a large, positive impact on total factor productivity growth, which feeds through to overall economic growth.

Jayarante and Strahan (1996) provide evidence that financial markets can directly affect economic growth by studying the relaxation of bank branch restrictions in the United States. They find that the rates of real, per capita growth in income and output increase significantly following intrastate branch reform. Improvements in the quality of bank lending, not increased volume of bank lending, appear to be responsible for faster growth.

Rajan and Zingales (1998) examine whether financial development facilitates economic growth by reducing the costs of external finance to firms. They find that industrial sectors that are relatively more in need of external finance develop disproportionally faster in countries with more-developed financial markets. As we discuss in more detail in the next section, they also overcome some of the identification problems embedded in standard cross-country growth regressions by using an interaction between a country characteristic (financial development of a particular country) and an industry characteristic (external financial dependence of a particular industry) in addition to country indicators and industry indicators.

Demirgüç-Kunt and Maksimovic (1997) show that well-developed financial systems are associated with externally financed firm growth. They also find that differences in legal systems affect firms' use of external financing to fund growth: in countries with efficient legal systems, a greater proportion of firms use long-term external financing.

There exists also a large empirical literature on the existence of a credit channel. This

literature tries to investigate to what extent adverse shocks to a borrower's net worth increase the cost of external financing, and through which channels these adverse effects occur. For households, Mishkin (1977) provides evidence of effects of household balance sheet conditions on consumer expenditures in the US during the 1973-75 depression.

Kashyap and Stein (2000) study the monetary-transmission mechanism using quarterly data on every insured US commercial bank for the period 1976-1993. They find that the impact of monetary policy on lending is stronger for banks with less liquid balance sheets, i.e., banks with lower ratios of securities to assets. Moreover, this pattern is largely attributable to the smaller banks. Their results support the existence of a "bank lending channel" of monetary transmission, though they do not allow us to make precise statements about its quantitative importance.

Peek and Rosengren (2000) use the Japanese banking crisis as a natural experiment to test whether a loan supply shock can affect real economic activity. Because the shock was external to US credit markets, yet connected through the Japanese bank penetration of US markets, this event allows one to identify an exogenous loan supply shock and ultimately link that shock to construction activity in U.S. commercial real estate markets. They exploit the variation across geographically distinct commercial real estate markets to establish conclusively that loan supply shocks emanating from Japan had real effects on economic activity in the United States.

Aggregate and financial shocks can affect the corporate sector by curtailing credit, including working capital and trade financing, to borrowers with valuable trading and investment opportunities (see Kashyap and Stein (1994) for a review). Real, financial or regulatory shocks can cause a real or perceived shortage of capital for banks. As a result, banks may become unwilling to lend even to viable companies and instead may prefer to invest excess liquidity in safe assets such as government

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bonds. A credit crunch can originate from weak financial institutions or from tightened regulation and supervision. Increased uncertainty about whether and at what price loans will be available can also result in a shortage of loanable funds (Stiglitz and Weiss, 1981). These effects can be particularly severe for bank lending because banks are more likely than other financial intermediaries or markets to lend to firms that suffer from a greater degree of informational asymmetries.

In addition, a so-called balance sheet effect can further amplify the effect of shocks on corporations (see Bernanke and Gertler (1995) for a review). Agénor and Aizenman (1999), Chan-Lau and Chen (1998), Kim and Stone (1999) in a domestic context and Greenwald (1999) in an international context show that generally weaknesses in the financial sector along with tighter regulation and supervision appear to contribute to corporate distress by curbing credit. Ding, Domac and Ferri (1998) and Ghosh and Ghosh (1999) provide some empirical evidence that tighter rules for financial institutions affected the supply of loanable funds in several countries. Changes in net worth of corporates were also likely to have been important in reducing the supply of financing.

Empirical research on identifying tools for the resolution and management of banking crises that are effective in resolving the crisis while limiting adverse economic spillover to the rest of the economy is sparse and most research in this area is limited to individual cases. Honohan and Klingebiel (2002) use cross-country evidence to determine whether specific crisis containment and resolution policies systematically influence the fiscal costs of resolving a crisis. They find that accommodating policies — such as blanket deposit guarantees, open-ended liquidity support, repeated recapitalizations, debtor bailouts, and regulatory forbearance — significantly increase fiscal costs of resolving a crisis. Claessens, Klingebiel and Laeven (2001) review the literature on crises resolution strategies.

III. Method

We apply the method in Rajan and Zingales (1998) to investigate the link between external financial dependence and industrial growth during financial crises. Rajan and Zingales (1998) relate real growth in value added of a sector to an interaction term that includes a proxy for financial development and an index of external financial dependence. They show that firms that are relatively more dependent on external finance develop disproportionally faster in countries with more-developed or deeper financial markets, that is, they find a positive relation between the interaction term and real growth in value added.

Their index of external dependence is constructed at the industry level based on data of US firms. They choose the financial structure of US industries as their benchmark because the relatively open, sophisticated, and developed US financial markets should allow US firms to face the fewest obstacles to achieving their desired financial structure. This approach offers a valid and exogenous way to identify the extent of external dependence of an industry anywhere in the world under the assumption that there are technological and economic reasons why some industries depend more on external finance than others, and that these differences persist across countries. They also overcome some of the identification problems embedded in standard cross-country growth regressions by using an interaction between a country characteristic (financial development of a particular country) and an industry characteristic (external financial dependence of a particular industry) in addition to country indicators and industry indicators. This approach allows them to isolate the impact of financial development on industry growth after controlling for cross-country and within-country differences, and is therefore less subject to criticism about an omitted variable bias or model

specification than traditional approaches. Our main innovation is to apply this approach to industries in countries experiencing financial crises to be able to investigate the real impact of shocks to the financial system in a country over time.

First, we estimate the basic model in Rajan and Zingales (1998) for our sample of countries (model 1).

$$RVAGR_{ij} = C_i + IND_j + \beta_1 * SHARE_{ij} + \beta_2 * FD_i * ED_j + \varepsilon_{ij} \quad (1)$$

where $RVAGR_{ij}$ is the real growth in value added of sector j in country i, C_i is a country dummy for country i, IND_j is an industry dummy for industry j, $SHARE_{ij}$ is the share of sector j in the total value added of country i, FD_i is the development of the financial system of country i, ED_j is the external dependence ratio of sector j according to Rajan and Zingales (1998). The specification thus includes fixed country and industry effects. We use three alternative proxies for the level of financial development of a country: total credit to GDP, private sector credit to GDP, and M2 to GDP.

The main differences with the Rajan and Zingales (1998) setup is twofold. First, we estimate the model for two sub-periods, namely, before and during a financial crisis. When estimating the model for the crisis period, we use the pre-crisis levels of share in value added and our proxies for financial development to avoid potential endogeneity problems. Second, we estimate the model for crisis countries only, that is, for countries that are listed in Caprio and Klingebiel (2002) as having experienced a financial crisis (and for which we have data). Note that by including country indicators into the regressions, we control for country-and industry-specifics. By including country

indicators for the crisis period, we are effectively controlling for the general severity of the crisis in each country.

We are also interested in the link between the interaction of financial dependence and financial development on the one hand and the difference in real growth in value added between the crisis period and the pre-crisis period on the other hand. In an alternative specification of model (1), we therefore use the difference in real growth in value added between the crisis period and the pre-crisis period as a dependent variable.

$$\Delta RVAGR_{ij} = C_i + IND_j + \beta_1 * SHARE_{ij} + \beta_2 * FD_i * ED_j + \varepsilon_{ij} \qquad (2)$$

where $\Delta RVAGR_{ij}$ is the difference in real growth in value added of sector j in country i between the crisis period and the pre-crisis period. In other words, $\Delta RVAGR_{ij} = RVAGR_{ij,crisis} - RVAGR_{ij,pre-crisis}$, where $RVAGR_{ij,crisis}$ is the real growth in value added of sector j in country i during the crisis period and $RVAGR_{ij,pre-crisis}$ is the real growth in value added of sector j in country i during the pre-crisis period. To avoid potential endogeneity problems, we use the pre-crisis levels of share in value added and our proxies for financial development.

Because there may not be a linear relationship between the interaction term $FD_i * ED_j$ and the real growth in value added of sector j in country i, $RVAGR_{ij}$, we also estimate the following model:

$$RVAGR_{ij} = C_i + IND_j + \beta_1 * SHARE_{ij} + \beta_2 * FD_i * HighED_j + \varepsilon_{ij} \qquad (3)$$

where $HighED_j$ is a dummy variable for "High External Dependence" that takes value of one if sector j is among the top-50% of most financially dependent sectors of all sectors considered by Rajan and Zingales (1998), and zero otherwise. This setup provides a robustness check that controls for measurement error in the external dependence ratio of each sector estimated by Rajan and Zingales (1998). In other words, we may expect that the most financially dependent sectors show a different growth pattern in well-developed countries on average, but there may not necessarily be a different effect for the most financially dependent sector and the second most financially dependent sector. Similar to model (2), we also estimate the following model:

$$\Delta RVAGR_{ij} = C_i + IND_j + \beta_1 * SHARE_{ij} + \beta_2 * FD_i * HighED_j + \varepsilon_{ij} \qquad (4)$$

IV. Data

The industry data is from Rajan and Zingales (1998). We use their measure of financial dependence by sector based on US firm-level data. Financial or external dependence is calculated as the fraction of capital expenditures not financed with cash flow from operations. The sectors considered by Rajan and Zingales (1998) are a mix of three-digit and four-digit ISIC (International Standard of Industrial Classification) level industries. Rather than use the mix of four-digit level sectoral breakdowns for some industries and three-digit level sectoral breakdowns for other industries in Rajan and Zingales (1998) is somewhat arbitrary, we use external dependence ratios for sectors on a three-digit ISIC level only. We therefore re-calculate the weighted average external dependence figure for the four-digit ISIC sectors on a three-digit ISIC level. For the sectors that are

already on a three-digit ISIC level in Rajan and Zingales (1998), we simply use their external dependence figures. For the sectors that are not already on a three-digit ISIC level, we apply the same method as in Rajan and Zingales (1998) to financial data on US firms from Compustat to estimate external dependence figures. Table 1 lists the three-digit ISIC level external dependence figures across sectors in the United States during the 1980s. We use these external dependence figures to construct a high external dependence ($HighED_j$) dummy variable that takes value of one if sector j is among the top-50% of most financially dependent sectors, and value of zero otherwise. Similarly, we construct a low external dependence ($LowED_j$) dummy variable that takes value of one if sector j is among the bottom-50% of most financially dependent sectors, and value of zero otherwise.

As measure of firm performance we use real growth in industry value added (annually compounded), the same measure as in Rajan and Zingales (1998). The data on value added for each industry in each country is obtained from the Industrial Statistical Yearbook database put together by the United National Statistical Division. The value added data are corrected for inflation using CPI data from the International Financial Statistics of the International Monetary Fund. We calculate the real growth in value added figures for sectors on a three-digit ISIC level as well. We also calculate the industry's share in total value added of the country, a variable used by Rajan and Zingales (1998).

Our measures of financial depth (total credit to GDP, private sector credit to GDP, and M2 to GDP) and the level of GDP per capita are from the International Financial Statistics of the International Monetary Fund.

We use the Caprio and Klingebiel (2002) data set to time crisis and pre-crisis periods. Since it is difficult to identify the crisis period precisely, we use (t-1, t+1) as the crisis period, where t is the first crisis year reported in Caprio and Klingebiel (2002). To ensure that the pre-crisis period is a

distinct period not affected by the crisis, we separate the pre-crisis period from the crisis period by three years. We define the pre-crisis period to be (t-8, t-4), if t-8 is available, otherwise as many years towards t-8 as possible, where t is the first crisis year reported in Caprio and Klingebiel (2002). This restricts the pre-crisis period to a maximum of 5 years. We only allow for one crisis period in a country, which is the first crisis mentioned in Caprio and Klingebiel (2002), to avoid identification problems in case of recurring crises.

We started with the Caprio and Klingebiel (2002) data set of systemic banking crisis countries. This data set includes 113 banking crises from 93 countries since the 1970s. Due to data constraints we need to drop a large number of countries. First, we do not have data on sectoral value added for many crisis countries. Second, we exclude countries for which we do not have data for both the pre-crisis and the crisis periods. This excludes, for example, Poland for which we do not have data for the pre-crisis period. We also drop countries for which we do not have sectoral value added data for at least five sectors. This excludes Argentina, for which we have only data available for four sectors during the pre-crisis period. The final data set includes 19 crisis countries, including both developing and developed countries. Table 2 presents a list of these countries. For each country, the table also shows the average real growth in value added and the number of sectors during both the pre-crisis and crisis period. We do not investigate the post-crisis periods, because we do not have sufficient data on post-crisis years for many of the countries in the sample.

The number of sectors varies widely across countries from 10 sectors in Hungary to 28 sectors in Chile, Finland, Israel or Sweden. To ensure consistency in a country across periods, we examine the same sectors in both the pre-crisis and crisis periods. This excludes a number of sectors for several countries for which we could obtain data in only one sub-period. We note that this setup

may lead to a potential selection problem because the data in the Industrial Statistical Yearbook is gradually becoming more comprehensive over time. Another potential selection effect would exist if entire sectors disappear during the crisis period. The latter is however not the case in our sample. Since we are interested in the difference in growth between the pre-crisis and crisis period, we need to use a balanced panel. The final data set contains a total of 448 sector-country observations from 19 crisis countries.

The number of firms within the sectors varies widely over time. In particular we see a large increase in the number of firms within certain sectors at certain points in time. This may be the result of a re-classification or the inclusion of firms that were previously excluded from the statistics on value added. In both cases, changes in value added are not related to firm performance, and such observations need therefore be excluded from the analysis. We have deleted all sectoral observations if the number of firms within the sector changed more than +100% or –50% (doubled or halved) between the pre-crisis and crisis periods. This criterion deletes around 5% of observations across the different sub-periods. We also have deleted observations if the real growth in value added exceeds 100%, which excludes only a small number of cases.

Table 3 presents the summary statistics of some variables that indicate changes in real sector and financial sector activity for both the pre-crisis and during crisis periods. When comparing the summary statistics of the pre-crisis and crisis periods, we find the following crisis characteristics. During crises periods, on average countries experience lower real GDP growth, lower real growth in sectoral value added (both for sectors that are highly dependent on external finance and sectors that are not), lower real growth of M2, and lower growth of (private sector) credit. Financial crises thus

are negatively correlated with real and financial sector activity and performance. These statistics also indirectly provide some reassurance about the appropriateness of the timing of the crisis periods.

Table 4 presents the pre-crisis levels of our proxies for financial development for our crisis countries. The financial development proxies indicate relatively low levels of financial development in countries like Bolivia, Chile, Columbia, and Mexico, and relatively high levels of financial development in Hungary, Japan, and Spain.

V. Results

First, we investigate the role of financial development on the link between external finance and sector growth for both pre-crisis and crisis periods. To this end, we estimate model (1) both for the pre-crisis period and the crisis period. The regression results are presented in panel A of Table 5. Each "pre-crisis" and "crisis" pair of columns uses a different measure of financial development. All standard errors are corrected for heteroskedasticity. Consistent with the findings in Rajan and Zingales (1998), we find for the pre-crisis "normal" period that financially dependent sectors grow on average disproportionally faster in countries with well-developed or deeper financial systems. In our sample, however, this result is statistically significant at the 10 percent level for only the total credit to GDP measure of financial development. This difference could partly be attributed to the fact that we have fewer observations than Rajan and Zingales (1998), since we focus on crisis countries. Another reason could be that we use external dependence figures on a three-digit level only. Our coefficient estimates for both the value-added share and the interaction term also are somewhat smaller than in Rajan and Zingales (1998).

During crisis periods, we find the opposite relationship, namely, that financially dependent

sectors grow disproportionably slower in countries with well-developed or deeper financial systems. In none of our specifications, however, is the coefficient on the interaction term between financial depth and external dependence statistically significantly different from zero.

In Panel B of Table 5, we investigate whether the crisis relation differs from the pre-crisis relation by using the difference in real growth in value added between the crisis period and the pre-crisis period, $\Delta RVAGR_{ij}$, as dependent variable (model (2) in the previous section). As in Panel A we have three alternative specifications with each using a different measure of financial development. The reduction in growth rate from the pre-crisis period to the crisis period is *larger* for financially dependent firms in countries with well-developed financial systems. The coefficient of the interaction term is statistically significantly different from zero in two of the three specifications. In other words, financially dependent firms appear to be hit disproportionally by a financial crisis if they operate in countries with developed financial systems. The effect is economically significant. A one standard deviation increase in credit-to-GDP, for example, would reduce the difference in real growth in value added between the crisis period and the pre-crisis period by 1.0 percent (and the mean decline in real growth in value added between the crisis period and the pre-crisis period is 6.0 percent).

Next, we use a dummy variable that indicates high or low external dependence rather than a continuous variable (models (3) and (4) in the previous section). The regression results are presented in Table 6. The coefficient estimates and levels of statistical significance in Table 6 are very similar to those in Table 5. The main difference with the results in Table 5 is that in Panel B the interaction term between $HighED_j$ and FD_i is now statistically significantly different from zero in all three specifications. The results in Tables 5 and 6 suggests that in times of crisis there is a negative

relationship between the interaction term of financial development or depth of the financial system and external dependence and real growth in value added.

VI. Data and Measurement Caveats

We note a number of caveats and qualifications with respect to our analysis. First, there is the question on the reliability of data during crises. Many firm-level variables react with a lag to adverse shocks. Firm performance variables such as growth in value added tend to respond to financial crises with a lag. Perhaps growth in value added is not a good measure of firm performance, in particular during periods of crisis. In addition, financial development indicators such as credit to GDP tend to increase during periods of crises as GDP decreases to a larger extent than credit.

Second, determining the precise timing of crises is difficult, both in terms of identifying the beginning and the end of a crisis. A crisis may build up slowly and may not be resolved soon. Especially in the case of a typical V-shape pattern of recovery from a crisis it is crucial to get the timing right in order not to under- or overestimate the impact on firm performance. We use the data in Caprio and Klingebiel (2002) to define the beginning of a crisis and allow for a certain degree of mistiming by using a three year period around the Caprio and Klingebiel (2002) year as crisis period.

Third, measures for the size of the financial system relative to GDP may not be good proxies for financial development. During periods of credit booms, often preceding financial crises (see Kaminsky and Reinhart, 1999), for example, (private) credit over GDP may overstate the level of financial development or depth of the financial system. In addition, the political-economy of the policy responses to a financial crisis could affect the availability of credit in crises (see Kroszner (1998) and Klingebiel, Kroszner, Laeven and Van Oijen (2001)).

Finally, one may question the appropriateness of the Rajan and Zingales (1998) proxy for financial dependence for our sample. Their approach uses US external dependence as proxy and assumes the same technological reasons that make a particular industry in the US more dependent on external finance than other industries in the US, also make this particular industry more dependent on external finance in all other countries around the world. Although this assumption is plausible, it may not hold for all countries for country-specific reasons. Many developing countries, for example, support certain industries through subsidies. These industries may be less dependent on external finance than without those subsidies.

VII. Conclusions

In normal crisis periods we find that firms that are relatively more reliant on external finance grow disproportionally faster in countries with deep financial systems consistent with Rajan Zingales (1998). When we examine crisis periods, however, we find the opposite relation: crises in the financial sector have a disproportionately negative impact on sectors that rely heavily on external sources of finance in countries with deep financial systems. Our results provide evidence on the mechanisms linking the financial and real sectors in a financial crisis.

We hypothesize that a deeper financial system allows sectors dependent on external finance to obtain relatively more external funding in normal periods, so a crisis would have a disproportionately negative effect on externally dependent firms in deeper financial systems. In contrast, since externally dependent firms tend to obtain relatively less external financing in a shallower financial systems (hence the relatively lower growth rates in externally dependent sectors in such countries during normal times), a crisis in such countries has less of an effect on the growth

of these sectors. In addition, it could also be that deeper financial systems are more efficient in enforcing hard budget constraints on firms during a financial crisis than are financial institutions in underdeveloped financial systems.

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Table 1 External Dependence Across Industries in the United States During the 1980s

This table reports the median level of external financing for ISIC industries during the 1980's on a three-digit ISIC level. We use the classification of the second revision of the ISIC. External dependence is the fraction of capital expenditures not finance with cash flow from operations. Cash flow from operations is defined as in Rajan and Zingales (1998). For the sectors that are already on a three-digit ISIC level in Rajan and Zingales (1998) we simply use their external dependence figures. For the sectors that are on a four-digit ISIC level in Rajan and Zingales (1998) we re-calculate the weighted average external dependence figure for the four-digit ISIC sectors on a three-digit ISIC level using *Compustat* and the method in Rajan and Zingales (1998).

ISIC code	*Industrial sector*	*External dependence*
314	Tobacco	-0.45
361	Pottery	-0.15
323	Leather	-0.14
324	Footwear	-0.08
372	Nonferrous metal	0.01
322	Apparel	0.03
353	Petroleum refineries	0.04
369	Nonmetal products	0.06
313	Beverages	0.08
371	Iron and steel	0.09
311	Food products	0.14
341	Paper and products	0.17
321	Textile	0.19
342	Printing and publishing	0.20
355	Rubber products	0.23
332	Furniture	0.24
381	Metal products	0.24
351	Industrial chemicals	0.25
331	Wood products	0.28
354	Petroleum and coal products	0.33
384	Transportation equipment	0.36
390	Other industries	0.47
362	Glass	0.53
382	Machinery	0.60
352	Other chemicals	0.75
383	Electric machinery	0.95
385	Professional goods	0.96
356	Plastic products	1.14

Table 2 Average Real Growth in Value Added for All Sectors Across Countries

This table reports the real growth in sectoral value added averaged by country and for both pre-crisis and crisis periods, as well as the years of each sub-period and the number of sectors included. The during crisis period is(t-1, t+1) where t is the first crisis year reported in Caprio and Klingebiel (2002). The pre-crisis period is (t-8, t-4), if t-8 is available, otherwise as many years towards t-8 as possible. The sample consists of a total number of 19 countries.

	Pre-crisis			*During crisis*		
Country	*Real growth in value added*	*Years*	*Number of sectors*	*Real growth in value added*	*Years*	*Number of sectors*
Bolivia	0.046	1978-82	21	-0.079	1985-87	21
Chile	0.111	1970-72	28	0.038	1975-77	28
Colombia	0.061	1974-78	27	-0.038	1981-83	27
Egypt	0.042	1983-87	24	0.032	1990-92	24
Finland	0.023	1983-87	28	-0.060	1990-92	28
Hungary	0.054	1983-87	10	-0.138	1990-92	10
Israel	0.057	1970-73	28	0.201	1976-78	28
Japan	0.054	1983-87	27	0.012	1990-92	27
Kenya	0.049	1977-81	23	0.038	1984-86	23
Malaysia	0.065	1977-81	22	0.041	1984-86	22
Mexico	0.055	1974-78	15	0.023	1981-83	15
New Zealand	-0.021	1979-83	26	-0.012	1986-88	26
Norway	-0.024	1979-83	27	-0.008	1986-88	27
Panama	0.019	1980-84	21	-0.206	1987-89	21
Spain	0.108	1970-73	25	0.131	1976-78	25
Sweden	0.035	1983-87	28	-0.222	1990-92	28
Turkey	0.071	1986-90	25	0.010	1993-95	25
Uruguay	0.021	1974-77	20	-0.133	1980-82	20
Zimbabwe	0.055	1987-91	23	0.006	1994-96	23

Table 3 Summary Statistics Before and During Crisis

Both for the pre-crisis and during crisis periods, this table list the summary statistics of the following variables: real growth in GDP, real growth in total credit, real growth in private credit, real growth in M2, real growth in value added of highly dependent (High ED) sectors, and real growth in value added of not-highly dependent (Low ED) sectors. The highly dependent sectors are those sectors that are among the top-50% of most financially dependent sectors on a three-digit ISIC level according to Rajan and Zingales (1998). Similarly, the not-highly dependent sectors are those sectors that are among the bottom-50% of most financially dependent sectors. The total sample includes 19 countries and 448 industry-country observations.

	Observations	*Mean*	*Minimum*	*Maximum*	*Std Dev*
Before Crisis					
Real growth in GDP	19	0.052	-0.003	0.160	0.040
Real growth in Total credit	19	0.118	-0.055	0.641	0.161
Real growth in Private Credit	19	0.108	0.005	0.403	0.093
Real growth in M2	19	0.088	-0.040	0.494	0.125
Real growth in value added of High ED sectors	205	0.058	-0.439	0.333	0.098
Real growth in value added of Low ED sectors	243	0.037	-0.686	0.393	0.102
During crisis					
Real growth in GDP	19	0.005	-0.076	0.150	0.047
Real growth in Total credit	19	0.096	-0.150	0.736	0.227
Real growth in Private Credit	19	0.099	-0.237	0.634	0.222
Real growth in M2	19	0.066	-0.206	0.460	0.157
Real growth in value added of High ED sectors	205	-0.018	-0.527	0.618	0.173
Real growth in value added of Low ED sectors	243	-0.010	-0.626	0.868	0.195

Table 4 Financial Depth Indicators

This table reports total credit-to-GDP, private credit-to-GDP, and M2-to-GDP at the beginning of the pre-crisis period in each country. These variables are used as proxies for financial depth. Data are from the International Financial Statistics of IMF. Since the figures are for the first year of the pre-crisis period for each country, they are not directly comparable across countries. The pre-crisis years can be found in Table 2.

Country	Total credit-to-GDP (pre-crisis)	Total private credit-to-GDP (pre-crisis)	M2-to-GDP (pre-crisis)
Bolivia	20.13%	12.96%	19.26%
Chile	17.20%	8.32%	15.24%
Colombia	24.41%	14.69%	19.76%
Egypt	98.79%	26.02%	82.57%
Finland	54.35%	55.56%	44.68%
Hungary	100.88%	48.81%	47.69%
Israel	50.52%	29.94%	51.32%
Japan	113.52%	93.23%	93.55%
Kenya	28.30%	19.92%	38.31%
Malaysia	31.49%	27.74%	45.95%
Mexico	17.25%	4.84%	15.47%
New Zealand	31.32%	21.57%	29.44%
Norway	54.34%	32.14%	52.94%
Panama	61.57%	54.36%	34.53%
Spain	75.11%	58.03%	54.13%
Sweden	73.77%	40.81%	54.26%
Turkey	38.32%	18.51%	28.52%
Uruguay	23.79%	18.51%	18.08%
Zimbabwe	25.27%	9.41%	25.58%

Table 5 Value Added Growth, Financial Dependence, and Financial Development: Before and During a Financial Crisis, With Continuous Financial Dependence Variable

Dependent variable in panel A is real growth in value added of sector. Dependent variable in panel B is the difference in real growth in value added between the crisis period and the pre-crisis period. Countries include Bolivia, Chile, Colombia, Egypt, Hungary, Spain, Finland, Hungary, Israel, Japan, Kenya, Mexico, Malaysia, Norway, New Zealand, Panama, Sweden, Turkey, Uruguay, Zimbabwe. Cut-off for difference in growth of number of firms within sector between sub-periods is +100% and –50% (doubled or halved). ED is the external dependency figure in Rajan and Zingales (1998) on a three-digit ISIC level (see Table 1). Country and industry dummies are included, but not reported. We use share in value added, total credit to GDP, private credit to GDP, and M2 to GDP for the first year of the pre-crisis period only. A constant was added, but is not reported. Heteroskedasticity-consistent standard errors between brackets. * significant at 10% level; ** significant at 5% level; *** significant at 1% level.

Panel A:

Variable	*Pre-crisis*	*Crisis*	*Pre-crisis*	*Crisis*	*Pre-crisis*	*Crisis*
Share in Value Added	***-0.316	***-0.554	***-0.299	***-0.593	***-0.298	**-0.531
	(0.114)	(0.211)	(0.113)	(0.212)	(0.115)	(0.208)
ED * Total Credit to GDP	*0.072	-0.077				
	(0.043)	(0.066)				
ED * Private Credit to GDP			0.056	-0.016		
			(0.046)	(0.071)		
ED * M2 to GDP					0.044	-0.164
					(0.057)	(0.099)
Prob>F	***0.000	***0.000	***0.000	***0.000	***0.000	***0.000
R-squared	0.207	0.384	0.204	0.382	0.204	0.388
Observations	448	448	448	448	448	448

Panel B:

Variable	*Crisis vs. Pre-crisis*	*Crisis vs. Pre-crisis*	*Crisis vs. Pre-crisis*
Share in Value Added	0.215	0.142	0.220
	(0.242)	(0.240)	(0.244)
ED * Total Credit to GDP	**-0.225		
	(0.111)		
ED * Private Credit to GDP		-0.124	
		(0.103)	
ED * M2 to GDP			*-0.280
			(0.150)
Prob>F	***0.000	***0.000	***0.000
R-squared	0.296	0.288	0.295
Observations	448	448	448

Table 6 Value Added Growth, Financial Dependence, and Financial Development: Before and During a Financial Crisis, With Dummy Variable Indicating High Financial Dependence

Dependent variable in panel A is real growth in value added of sector. Dependent variable in panel B is the difference in real growth in value added between the crisis period and the pre-crisis period. Countries include Bolivia, Chile, Colombia, Egypt, Hungary, Spain, Finland, Hungary, Israel, Japan, Kenya, Mexico, Malaysia, Norway, New Zealand, Panama, Sweden, Turkey, Uruguay, Zimbabwe. Cut-off for difference in growth of number of firms within sector between sub-periods is +100% and –50% (doubled or halved). High ED indicates above median external dependence. Country and industry dummies are included, but not reported. We use share in value added, total credit to GDP, private credit to GDP, and M2 to GDP for the first year of the pre-crisis period only. A constant was added, but is not reported. Heteroskedasticity-consistent standard errors between brackets. * significant at 10% level; ** significant at 5% level; *** significant at 1% level.

Panel A:

Variable	*Pre-crisis*	*Crisis*	*Pre-crisis*	*Crisis*	*Pre-crisis*	*Crisis*
Share in Value Added	***-0.337	**-0.555	***-0.307	**-0.551	***-0.316	**-0.547
	(0.115)	(0.216)	(0.115)	(0.217)	(0.117)	(0.217)
High ED * Total Credit to GDP	*0.062	-0.055				
	(0.034)	(0.059)				
High ED * Private Credit to GDP			0.043	-0.070		
			(0.037)	(0.061)		
High ED * M2 to GDP					0.050	-0.076
					(0.044)	(0.077)
Prob>F	***0.000	***0.000	***0.000	***0.000	***0.000	***0.000
R-squared	0.210	0.384	0.205	0.384	0.205	0.384
Observations	448	448	448	448	448	448

Panel B:

Variable	*Crisis vs. Pre-crisis*	*Crisis vs. Pre-crisis*	*Crisis vs. Pre-crisis*
Share in Value Added	0.227	0.193	0.216
	(0.244)	(0.241)	(0.245)
High ED * Total Credit to GDP	**-0.139		
	(0.068)		
High ED * Private Credit to GDP		**-0.144	
		(0.068)	
High ED * M2 to GDP			*-0.158
			(0.090)
Prob>F	***0.000	***0.000	***0.000
R-squared	0.294	0.291	0.292
Observations	448	448	448

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